

REMARKS

The Examiner's Office Action of December 24, 2003 has been received and its contents reviewed. Applicants would like to thank the Examiner for the consideration given to the above-identified application.

By the above actions, claims 1 and 3 have been amended, and claims 2 and 7 have been cancelled. Accordingly, claims 1, 3-6, and 8-14 are pending for consideration, of which claims 1 and 3 are independent. In view of these actions and the following remarks, reconsideration of this application is now requested.

Referring now to the detailed Office Action, claims 1-14 stand rejected under 35 U.S.C. §103(a) as unpatentable over the combination of Choi et al. (U.S. Patent No. 6,168,991 – hereafter Choi) and Moise et al. (U.S. Patent No. 6,534,809).

In the interest of expediting the allowance of this application, Applicants have amended independent claims 1 and 3, as shown above, to further distinguish the presently claimed invention from that of Choi and Moise and to overcome the §103(a) rejection.

As amended, claim 1 recites the step of forming a conducting film to be formed into the lower electrode of the capacitor device including the sub-steps of:

forming a lower conducting film over a substrate by sputtering; and

forming an upper conducting film directly on and in contact with the lower conducting film by CVD,

wherein the lower conducting film has a thickness of 0.5 nm through 5 nm. Specifically, an essential feature amended is the lower conducting film having a thickness of 0.5 nm through 5 nm, which was found in cancelled claim 2.

As amended, claim 3 recites the step of forming a conducting film to be formed into the upper electrode of the capacitor device including the sub-steps of:

forming a lower conducting film over the capacitor dielectric film by sputtering; and

forming an upper conducting film directly on and in contact with the lower conducting film by CVD,

wherein the lower conducting film has a thickness of 0.5 nm through 5 nm. Specifically, an essential feature amended is the lower conducting film having a thickness of 0.5 nm through 5 nm, which was found in cancelled claim 7.

Thus, an essential feature of the invention recited in amended claims 1 and 3 is the lower conducting film having a thickness of 0.5 nm through 5 nm.

As illustrated in Fig. 1C, the lower conducting film 15a having a thickness of 0.5 nm through 5 nm is formed by sputtering. Subsequently, as illustrated in Fig. 2A, the upper conducting film 15b is formed directly on and in contact with the lower conducting film 15a by CVD, such that the conducting film 15 is formed into the low electrode, which is formed from a multi-layer film composed of the lower conducting film 15a and the upper conducting film 15b.

According to this configuration, the conducting film to be formed into the lower electrode is formed from the multi-layer film composed of the lower conducting film and the upper conducting film. Since the lower conducting film is formed by the sputtering, the conducting film to be formed into the lower electrode is improved in the morphology, which improves the quality of the capacitor dielectric film formed on the conducting film. Also, since the upper conducting film disposed on the lower conducting film is formed by the CVD, the conducting film to be formed into the lower electrode attains a uniform thickness. Thus, the conducting film to be formed into the lower electrode is minimally agglomerated during annealing for forming the capacitor dielectric film. As a result, the lower electrode can be prevented from being disconnected at bottom corners. Furthermore, the lower conducting film has a thickness of 0.5 nm through 5 nm so as to keep the continuity of the lower conducting film and to improve the thickness uniformity of the upper conducting film. Support for the amendments can be found in, e.g., page 17, lines 11-24 of the specification.

With respect to Choi, the reference discloses a lower conducting film having a thickness of 300 Å to 500 Å (30 nm to 50 nm).

With respect to Moise, the reference discloses that a bottom electrode 124 has a thickness of 25 nm to 100 nm and is a stack comprised of 30 nm IrO_x and 20 nm Ir (see col. 9, lines 27-40). Moreover, Moise discloses that a top electrode has a stack comprised of a conductive oxide (128) having a thickness of 50 nm to 100 nm and a metal layer (130) having a thickness of 50 nm to 100 nm.

In addition to the arguments submitted in the Amendment filed October 3, 2003, Applicants respectfully assert that both Choi and Moise fail to teach, disclose, or suggest the step of forming a lower conducting film having a thickness of 0.5 nm through 5 nm by

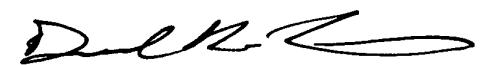
sputtering, and the step of forming an upper conducting film on the lower conducting film by CVD. Hence, the presently claimed invention is clearly distinguishable over Choi and Moise.

The requirements for establishing a *prima facie* case of obviousness, as detailed in MPEP § 2143 - 2143.03 (pages 2100-122 - 2100-136), are: first, there must be some suggestion or motivation, either in the reference themselves or in the knowledge generally available to one of ordinary skill in the art, to modify the reference to combine the teachings; second, there must be a reasonable expectation of success; and, finally, the prior art reference (or references when combined) must teach or suggest all of the claim limitations. As Choi and Moise fail to teach, disclose or suggest the lower conducting film having a thickness of 0.5 nm through 5 nm as recited in amended claims 1 and 3, their combination in the §103(a) is improper.

In view of the amendments and arguments set forth above, Applicants respectfully request reconsideration and withdrawal of all the pending rejections.

While the present application is now believed to be in condition for allowance, should the Examiner find some issue to remain unresolved, or should any new issues arise, which could be eliminated through discussions with Applicants' representative, then the Examiner is invited to contact the undersigned by telephone in order that the further prosecution of this application can thereby be expedited.

Respectfully submitted,



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